G A R R A R D
of England

Models GT255 (P and AP) GT355 (P and AP)
DD450, DD455
DDQ550, DDQ650
(including variants of these models)

Servicing information

GT255

DD455

DDQ650

Introduction
These are all high quality turntables with integrated mounting bases and lift off dust covers. The main functional differences between them are, method of turntable drive; A.C. synchronous, D.C. servo or direct drive and degree of automatic operation. This manual should be used in conjunction with the relevant exploded views parts list and instruction manual, part numbers are given below for your guidance.

Model	Exploded view parts list	Customer instruction manual
GT255 and GT355	82268	82160 or 82159
DD450 and DD455	82275	81832 or 81831
DDQ550 and DDQ650	82264	81834, 81833 or 82162

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IMPORTANT

Disconnect the power supply as appropriate when carrying out service work. Ensure that the standard of electrical insulation and safety is not impared during servicing.

ADJUSTMENTS

Direction of rotation is described when looking at the head of an adjusting screw.

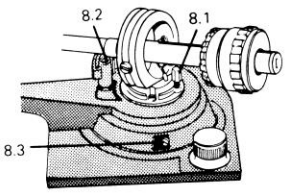
1. Tonearm lifting height (All models)
After playing a record the tonearm will rise, return to its rest, then settle onto it and the unit switches off.
A restrictor prevents the arm from lifting too high.
If adjustment is needed:

   1 Switch the power off as the arm returns to its rest and turn the restrictor screw (8.2) clockwise to disengage it.

   2 Turn the lifting height adjusting screw (8.1) clockwise to reduce or counterclockwise to increase height.

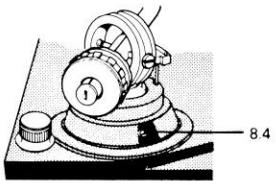
   3 Reset the restrictor screw (8.2) by turning it counterclockwise until there is about 1/16in (1.5mm) free upward movement at the front of the tonearm. Note that on certain models restrictor screw is accessable through hole in top of pickup arm with a small hexagone key. (Direction of rotation reversed).

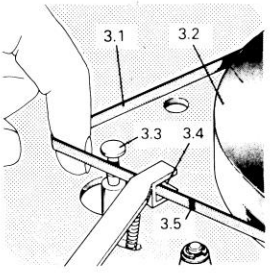
   4 Switch on again to allow the automatic cycle to be completed.



2. Tonearm lowering position (Fully auto models)

The stylus should land on a record at the bottom of the sloping groove guard rim. If adjustment is needed:
Secure the tonearm to its rest for safety and turn the adjusting screw (8.3) clockwise to move the landing position further in or counterclockwise to move it further out.
If the tonearm overshoots its rest after playing:
Set the 'Cue' lever to 'Lift', move the arm fully outwards and steady it while turning the adjusting screw (8.4) clockwise. Retest.
Note that screw 8.3 controls position of arm landing in pickup rest on player models.



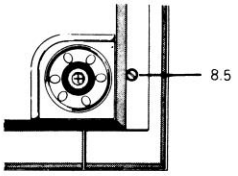


3. Speed change arm height (A.C. motor belt drive models)

The drive belt (3.1) must not touch the speed change arm (3.4) after changing speed. If adjustment is needed:

   1 Lift off the platter and dust cover, secure the tonearm and support the unit on its side.

   2 Insert a small screwdriver into the adjusting screw access hole (8.5) in the bottom of the base. Turn the screw clockwise to lift the arm, counter-clockwise to lower it. Check that the belt is clear of the arm at both 33 and 45 rev/min, when running.



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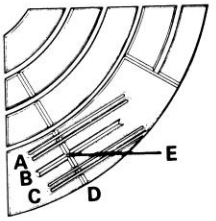
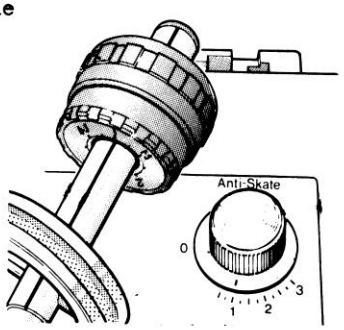
4. Cartridge position (All models)



1 To set the cartridge position, turn the platter mat upside down and refit it. Support the tonearm just clear of the mat, using the 'Cue' control, and rotate the platter until the pairs of guide lines A and C are parallel with the sides of the head moulding. When fully lowered, the stylus tip should now land at the point E where the guide lines B and D cross. If it does not, make a final minor adjustment by moving the finger lift backwards or forwards until all the following conditions are met:
   a The stylus tip sits centrally at point E.
   b The cartridge is parallel with the sides of the head moulding.
   c The head moulding is parallel with guide lines A and C.

2 Secure the tonearm to its rest and tighten the cartridge fixing screws firmly, but not excessively. Turn the mat over.

5. Setting stylus force



1 Secure the tonearm to its rest and press the counter-balance weight with its front calibrated barrel facing the tonearm head, about halfway along the tube at the back of the tonearm.

2 Turn the anti-skate control to '0' and remove the stylus guard or swing it clear, according to type.

3 Release the tonearm and support it above the outside edge of the platter mat to safeguard the stylus.

4 Wind the weight backwards or forwards along the tonearm until it balances with the stylus tip $\frac{1}{8}$in (3mm) clear of the mat. Secure the tonearm to its rest again.

5 Hold the body of the balance weight still and turn its front barrel until the '0' mark is at the line on the top of the tonearm. Balance will be upset if the weight is accidentally turned with the barrel.

6 Turn the weight and barrel together in a counterclockwise direction (seen from the front of the arm) until the figure corresponding to the required stylus force in grams is at the line. The barrel is calibrated from 0 - 3gm in $\frac{1}{4}$gm steps.

- Minimum recommended stylus force with a capable cartridge is $\frac{3}{4}$gm.
- The cartridge should weigh 4 - 9 gm.
- When the unit is supplied with a cartridge, its stylus force (on grams) is shown on the identification ticket on the packing carton.

7 Set the anti-skate force as follows:

The anti-skate control has a calibrated scale. Turn the control to correspond with the stylus force already set. For instance, if a cartridge calls for a stylus force of 1 gm, set the calibration mark on the control to the figure '1' on the scale.

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6. Pickup arm bearings (horizontal) Gimbal ring models

The horizontal arm pivots must be quite free, under spring pressure, with a minimum end play of 0.25mm (0.01in).
No adjustment is provided, but make sure that the right hand pivot screw is tight. Change spring-loaded pivot screw as necessary. On gimbal barrel models adjustment is provided by releasing lock nut on right hand pivot screw. Free movement with minimum play is optimum condition.

7. Pre-set speed control (D.C. motor belt drive and direct driven models with pitch control)

With the base plinth cover removed, select for 33⅓ rev/min and the pitch control knob in its mid-travel position, adjust the pre-set potentiometer on the P.C.B. so that the appropriate strobe band on the turntable appears stationary with the unit running.

Repeat for 45 rev/min speed.

Note - the presets are positioned on the motor P.C.B. for direct driven models and on the control P.C.B. for belt driven models.

8. Mechanism drive belt tension
To set the belt tension:
With turntable and belt removed, and access to the underside of the base, slacken screws securing turntable spindle housing. Bias the spindle housing to the left of centre of the unit base moulding so that the mechanism drive belt tightens. Secure the spindle housing. Ensure the spindle housing does not move during this operation.
To check the setting, the force required to close the loop of the belt together to be 90 to 120 gm applied to one side of the belt. The belt will appear slack in its normal state with sufficient tension to avoid belt slip when the mechanism is driven through its cycle with the tonearm slipped to its rest.

9. Motor pulley position

If the motor pulley is required to be changed for any reason, first remove the base as previously described. Remove the three circlips and washers which retain the motor plate assembly to the base. Withdraw the motor plate assembly. Heat a large bit electric soldering iron and hold against the shank of the pulley until it is expanded sufficiently to allow the pulley to be pulled off the spindle. Replace the pulley in the same way and push on to the spindle so that the bottom of the pulley is 1.25mm (0.05in) above the mounting plate.

10. Cueing lowering rate

The cueing lowering rate has been adjusted during assembly, but if for any reason it requires adjustment to increase or decrease the rate, this may be achieved by rotating the nut (80256) at the bottom end of the cueing lifter spindle clockwise to increase the rate or anti-clockwise to decrease the rate of lowering. This adjustment also alters the pickup arm lifting rate. Should the preceding adjustment fail to reduce the rate of cueing or lifting, the mechanism will require to be removed from the unit in order to apply a charge of viscous damping fluid to the lifter spindle.

DISMENTLING

1. Tonearm assembly

With the player inverted;

Remove the plinth cover (eight fixing screws). Note sequence and position then unsolder the tonearm leads at the connector strip and remove all lead dressing attached to the mechanism or base.

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Turn the player over and rest it on the plinth. Remove two screws 31039 which attach the arm on gimbal ring models or slacken hexahon screw 81822/022 on gimbal barrel types.
The arm assembly may now be lifted off the unit. Care must be taken to ensure the tonearm leads do not catch as they are withdrawn. When replacing the arm ensure that the grounding lead is attached to the arm and that the lead dressing is replaced allowing adequate freedom for lead movement.

2. Pickup base cover

Having first removed the pickup arm as in 1 above, pull off the bias control knob and remove retaining clips, lift off the pickup base cover.

3. Lifting platform assembly

This is removed from the base moulding by undoing the three retaining screws 31029/017.

4. Bias compensator assembly

Pull off the bias control knob and remove the retaining screws 31029/017. The bias plate assembly can be removed by feeding the tail of the bias lever 81451 around its operating pin on the pickup lever.

5. Mechanism module

Remove the pickup arm as described in paragraph 1. Remove any grounding lead which may be attached to the mechanism casting. Disconnect the drive belt by first removing the pinion bearing and its retaining screw. Withdraw the pinion spindle 78742 through the hole vacated by the pinion bearing. Care must be taken to recover the brass washer which is fitted to the pinion spindle, between the retaining circlip and the end of the pinion. Remove the four screws which retain the module to the base moulding. The module can now be taken off the base by easing the casting locating pegs out of their tight-fitting location holes in the base moulding. If necessary the tonearm spindle and overload assembly may also be removed by removing nut from the spindle at the bottom of the mechanism casting (locked with coloured lacquer).

6. P.C.B. assembly (D.C. motor belt driven models)

This is removed from the unit simply by disconnecting the leads and plugs from the p.c.b. and removing the screws at each corner of the board.

7. Stroboscope L.E.D. housing

Two attachment screws are accessible through holes in the p.c.b. Disconnect the two-pin plug from its socket, pull off the pitch control knob from the potentiometer, undo the two retaining screws and lift off the housing.

8. Front control trim

To remove the control trim remove the three retaining clips (00290/003) on the inside face and withdraw the trim. On models having electronic button controls the complete sub assembly of p.c.b., button housings, L.E.D.'s and trim should be removed in one piece. Various parts such as L.E.D.'s, button switches or trim may then be removed or replaced.

9. Front control sub assembly (All models with mechanical controls)

Before removal note position of all links, switches and leads.
To remove first disconnect impulse link 81580 from cycle lever 81588 and programme link 81581 from programme lever by removing clip, Take out micro switch retaining screws and remove screws 31029/017 retaining control plate. Carefully lift assembly guiding remaining links from their locations. If removing control levers from plate ensure index spring and balls are not misplaced.

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Overload protection springs are fitted to programme control link and cueing link.
Note: If difficulty is experienced in removal of retaining clips (30993/002) this can be dealt with by clipping off the old retainers and fitting new when reassembling.

10. Direct drive motors

Note positions of and remove connecting leads to motor p.c.b. Remove the motor thrust plate and screws to disconnect the mechanism drive belt, then replace the plate. Remove the four motor fixing screws and withdraw the motor and p.c.b. assembly from the underside of the unit. When replacing the motor adjust the mechanism drive belt as per instruction under 'Adjustments 8'.
Check motor connections with the appropriate circuit diagram in this manual.

Note: One motor pillar locates in the motor plate to give pivot point for setting belt. Ensure pillar is located and screw partially tightened before setting.

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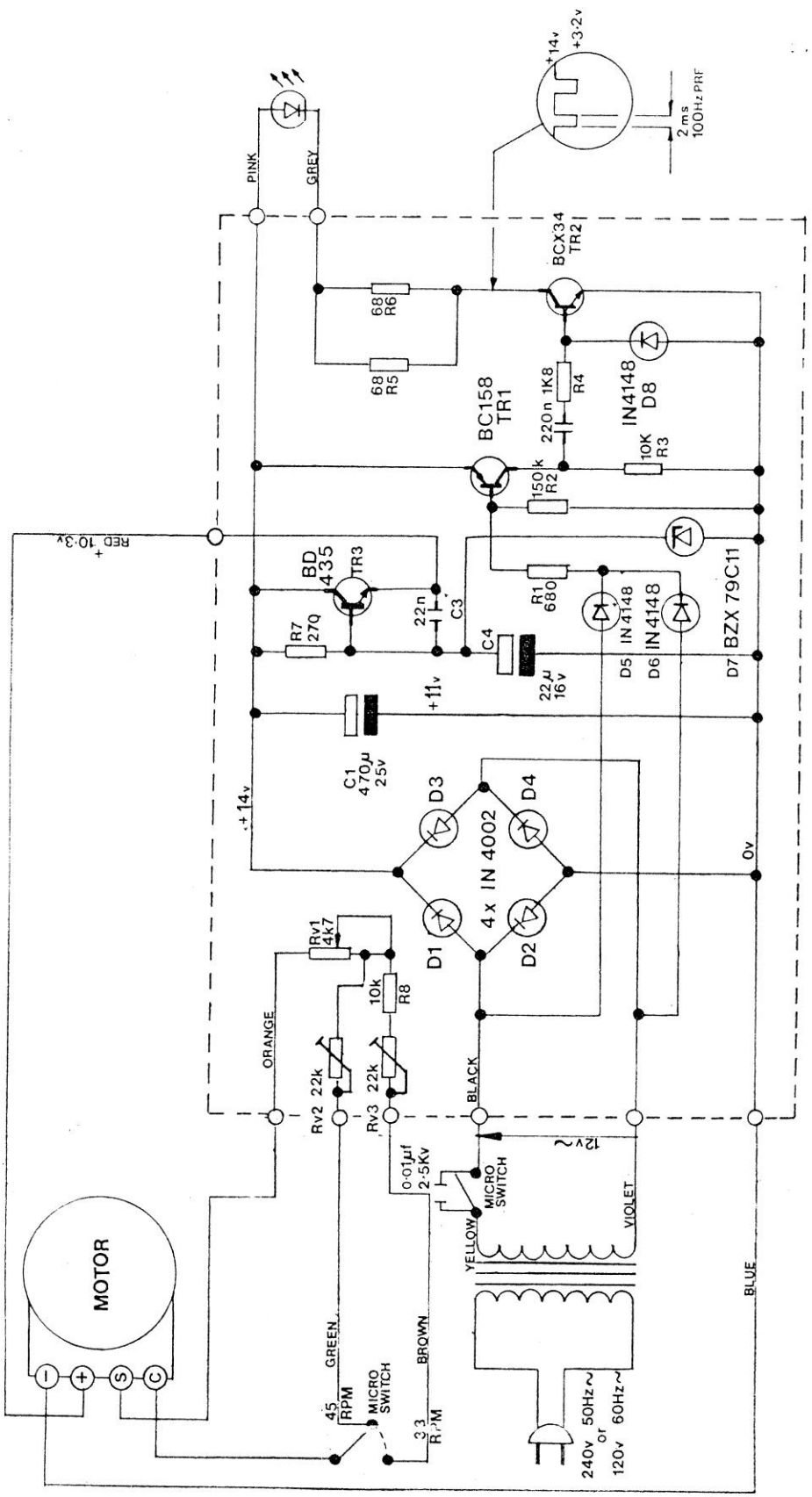

ALL VOLTAGES ± 5% FOR 220, 240, 120v A.C. INPUT WITH MOTOR RUNNING FREE (TURNTABLE FITTED)

COMPLETE CIRCUIT DIAGRAM , FIG I

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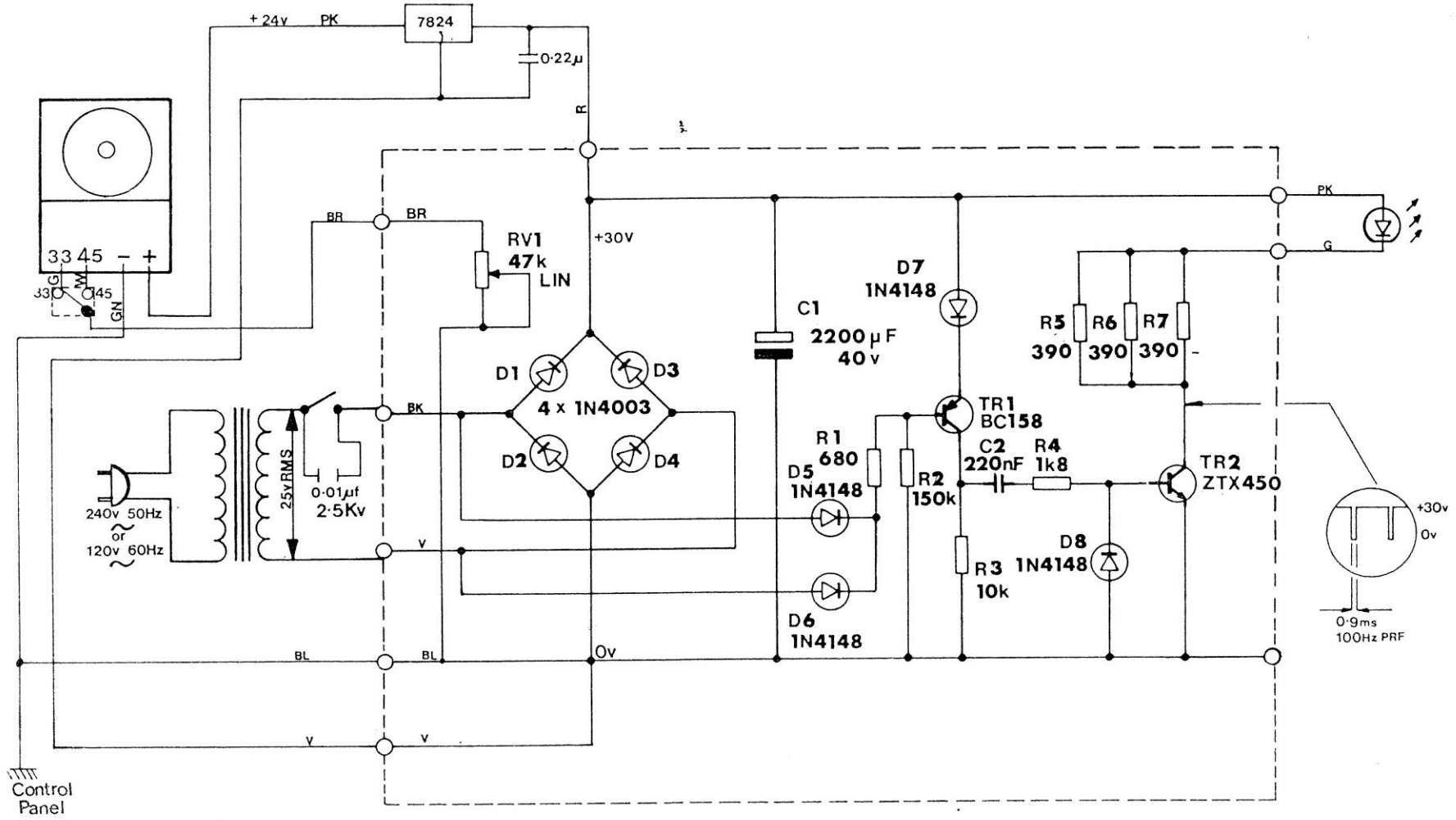
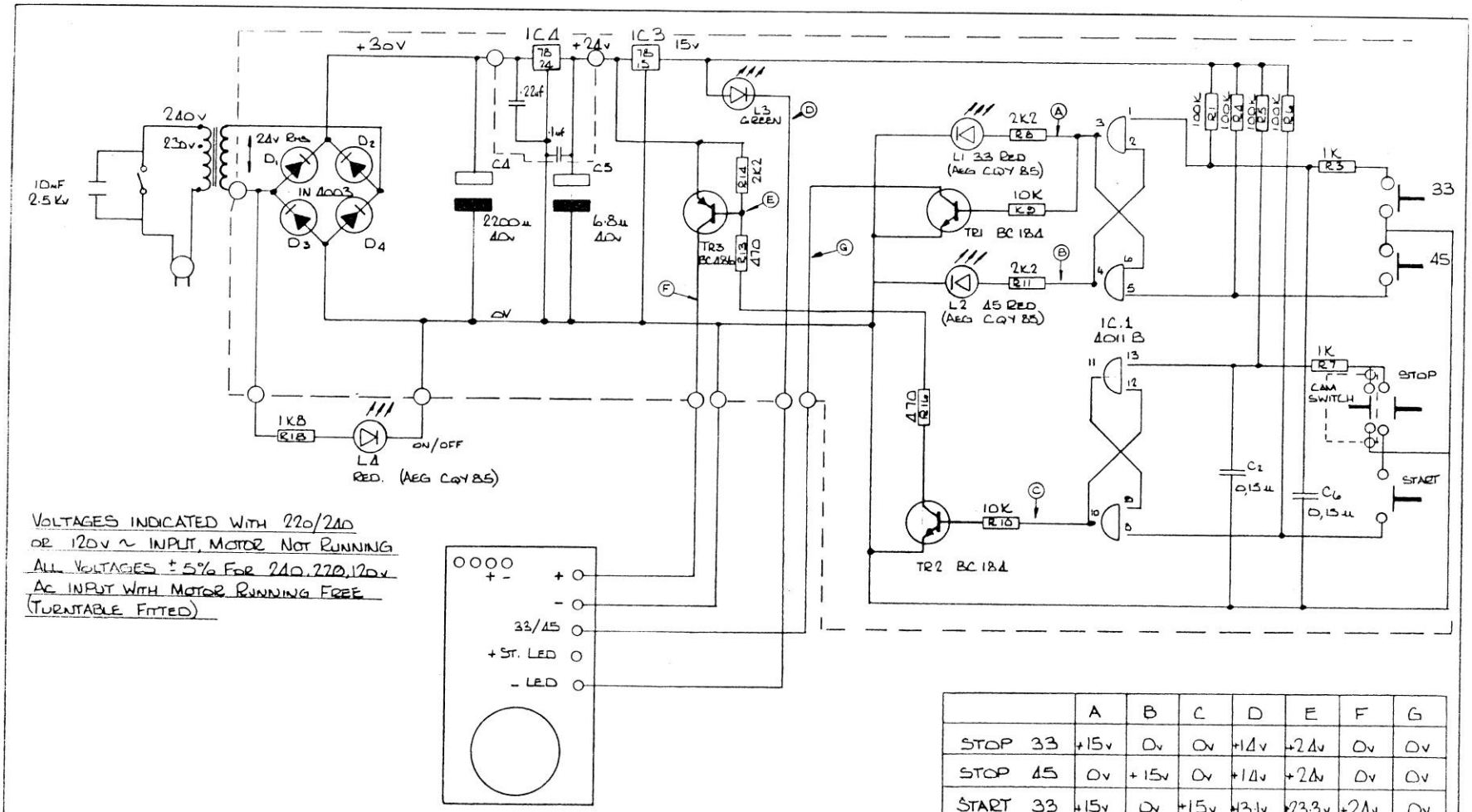


All voltages ±5% for 240, 220, 120v. A.C. input with motor running free (turntable fitted)

COMPLETE CIRCUIT DIAGRAM . FIG I

82347



VOLTAGES INDICATED WITH 220/240 OR 120v ~ INPUT, MOTOR NOT RUNNING
ALL VOLTAGES ± 5% FOR 240, 220, 120v AC INPUT WITH MOTOR RUNNING FREE (TURNTABLE FITTED)

	A	B	C	D	E	F	G
STOP 33	+15v	0v	0v	+14v	+24v	0v	0v
STOP 45	0v	+15v	0v	+14v	+24v	0v	0v
START 33	+15v	0v	+15v	+13.1v	+23.3v	+24v	0v
START 45	0v	+15v	+15v	+13.1v	+23.3v	+24v	+8.3v

32349 FIG.1 COMPLETE WIRING DIAGRAM

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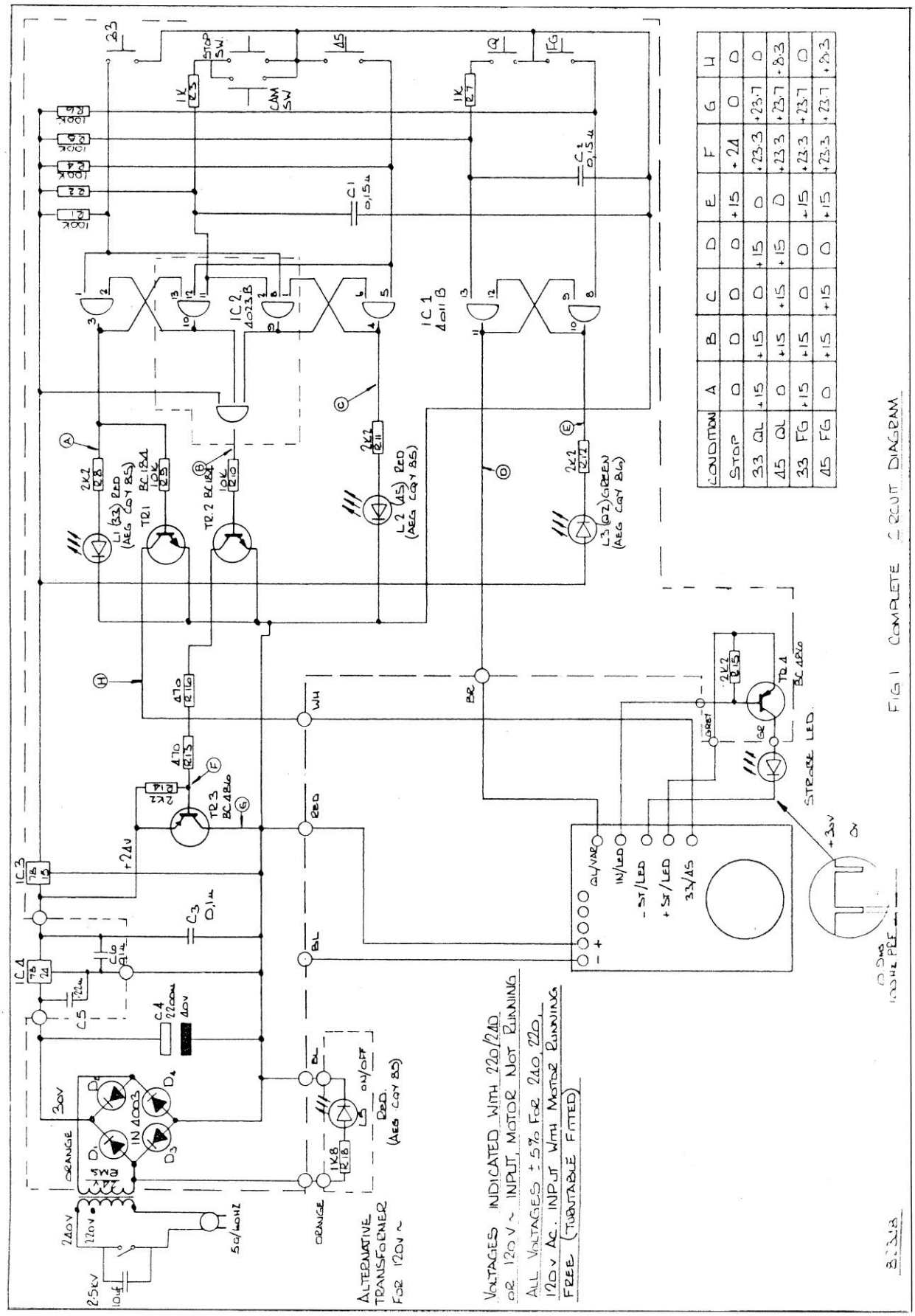

CONDITION	A	B	C	D	E	F	G	H
STOP	0	0	0	0	+15	+24	0	0
33 QL	+15	+15	0	+15	0	+23.3	+23.7	0
45 QL	0	+15	+15	+15	0	+23.3	+23.7	+23.3
33 FG	+15	+15	0	0	+15	+23.3	+23.7	0
45 FG	0	+15	+15	0	+15	+23.3	+23.7	+23.3

FIG 1 COMPLETE CIRCUIT DIAGRAM

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FAULT DIAGNOSIS

It must be borne in mind that many faults, real and apparent, can be caused by incorrect installation, wiring or operation. They can also be attributed to warped, damaged or dirty records, faulty associated wquipment or damage suffered as a result of rough handling in transit.

As previously stated, before servicing or making adjustments, disconnect the power supply wherever practicable.
Remove headshell with cartridge, or protect stylus, secure pickup arm on its rest wherever practical.
When the pickup arm is secured to the rest, it must NEVER be in the manually cued up or automatically lifted position. This may result in permanent distortion of the rubber insert in the lifting platform.

Audio problems

Symptom	Cause	Remedy
No sound on one or more channels, or only low volume sound.	1 Pickup cartridge,amplifier or speakers faulty.	1 Check by substitution and interchanging channel connections. Repair or replace as appropriate.
	2 Connections at the pickup head faulty. Pickup arm leads or audio connections faulty.	2 Disconnect cartridge and carry out continuity checks on leads and connections. Disconnect head shell and carry out continuity checks on arm leads and connectors.
	3 Incorrect amplifier input selected.	3 Select input with sufficient gain for cartridge fitted.
	4 Cartridge not compatible with amplifier (low volume both channels).	4 Replace cartridge with correct type.
Sound distorted, possibly as a result of pickup mistracking.	1 Insufficient or excessive stylus force.	1 Reset stylus force to cartridge manufacturer's recommendations. See 'Adjustments'.
	2 Worn, chipped or incorrect stylus tip.	2 Examine stylus tip microscopically and check condition of stylus bar. Fit new stylus if necessary.
	3 Accumulation of dust around the stylus tip.	3 Clean with camel-hair brush.
	4 Pickup cartridge insecurely fixed or out of position.	4 Reset cartridge using gauge, tighten fixing screws. See 'Adjustments'.
	5 Incorrect amplifier input selected.	5 Select input with the correct gain for cartridge.
	6 Tight pickup leads at back of pickup arm.	6 Relieve tension, leaving leads slack. Check that leads are not caught in moving parts of mechanism.
	7 Heel of cartridges touches record.	7 Fit tilt wedge, deep end forward, between top of cartridge and underside of headshell.

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Symptom	Cause	Remedy
	8 Acoustic feedback.	8 Check that turntable is not too close to speakers. Unit must be free to move on its resilient feet.
	9 'Cue' control not fully lowered.	9 Move control to left hand position.
	10 Unit not mounted level.	10 Check with spirit level. Stand base on a horizontal surface.
	11 Plastic dust cover cleaned with dry cloth, so that static electricity attracts pickup arm.	11 Wipe the cover with a clean damp cloth.
	12 Pickup arm bearings tight.	12 Check horizontal freedom of pivots (vertical motion). Fit new pivot screw if necessary. Check the vertical pivot assembly for freedom of movement. Check side forces on arm.
	13 Pickup lever binding.	13 Check pickup lever is not bent. Check clearance between pickup lever and bias plate. Replace pickup lever, improve clearance by bending corner of bias plate if necessary.
	14 Bias compensator maladjusted, excessive bias force.	14 Reset bias control. Check bias mechanism for correct functioning. Replace spring as necessary.
	15 Insufficient clearance between lifting platform insert and arm tube. Result of fitting a shallow cartridge without resetting pickup arm lifting height.	15 Check height, and reset. See 'Adjustments'. Note: When adjusting the height, great care must be taken to ensure that the top of the headshell does not hit the underside of cover.
Hum	1 Grounding lead(s) disconnected.	1 Reconnect.
	2 'Ground loop' in pickup wiring system.	2 No part should be connected to ground by more than one route. If a second route exists, including wire on phono leads, disconnect it.
	3 Faulty audio connections, such as plug, pickup head and socket. Damaged pickup leads, or phono leads.	3 Check security of leads to pickup cartridge at head shell and arm socket, check correct function of connecting pins in arm socket. Carry out continuity tests on leads and connectors. Replace as necessary.
	4 Proximity of audio and AC power leads.	4 Reroute leads, checking that pickup leads do not hang in long loops.
	5 Polarity of mains AC power	5 Reverse connections at the

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Symptom	Cause	Remedy
Rumble	1 Turntable spindle and/or turntable hub bearings dry or dirty.	1 Remove turntable, clean and relubricate.
	2 Unit resilient mounting feet too still or distorted.	2 Check feet and unit freedom of movement on feet, check feet not bottoming. Replace feet as necessary.
	3 Motor or transformer plate grommets not resilient.	3 Check motor and transformer plate hangs freely and level in its rubber mountings.
	4 Rumble on particular records only.	4 Recorded rumble. Use amplifier's rumble filter, if fitted. Otherwise no cure.
	5 Excessive AC ripple in regulated DC motor supply (GT355 series).	5 Using a decoupling capacitor (200uF), measure the AC voltage across red motor lead and zero volts line. It should not exceed 20mV r.m.s. Check electrolytic capacitors by substitution and replace as necessary.
	6 Tight isolator in pickup arm counterbalance weight.	6 Pull off front of weight and check foam pad and spring are central.
Wow and Flutter.	1 Recorded wow and flutter. Record hole off-centre or enlarged.	1 No cure.
	2 Warped record.	2 No cure.
	3 Lubricant on turntable drive belt.	3 Clean belt, turntable hub and motor pulley.
	4 Automatic mechanism drive belt tight or slack.	4 Reset tension. See 'Adjustments'.
	5 Motor pulley or turntable drive belt out of position.	5 Reset height. See 'Adjustments'
	6 Damaged motor spindle.	6 Fit new motor.
Radio or television sound heard through speakers.	1 Radio frequency signals detected by amplifier.	1 This trouble is seldom caused by the record player, providing grounding and audio connections have been made securely and the audio connecting lead is kept short. The amplifier manufacturer should be consulted in persistent cases.

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Mechanical problems

Symptom	Cause	Remedy
Pickup arm will not	1 Pickup arm lifting height or height restriction adjustment upset. Arm not balanced before setting stylus force.	1 Reset. See 'Adjustment'.
	2 Pickup arm not released from rest.	2 Move locking catch to free position.
	3 Excessive stylus force.	3 Check and reset stylus force. See 'Adjustments'.
	4 Mechanism drive belt broken.	4 Fit new belt.
	5 Mechanism friction too low.	5 Check friction and reset.
	6 'Auto' operating control not fully to the end of movement, or not held in 'Auto' position long enough to allow trip pawl to be picked up by the turntable drum striker.	6 Move control to fullest extent of its travel and hold in that position for a few moments.
	7 Friction between the pickup arm tube and the insert in the lifting platform is too high.	7 Check is not too high. Maximum value of side force due to friction is 4g.
Pickup arm lands too far in or out on the record. (Automatic players)	1 Pickup arm lowering position out of adjustment.	1 Reset. See 'Adjustments'.
	2 Record speed/size selector incorrectly set.	1 Move control to 33 or 45 for 12in or 7in respectively.
Pickup arm continuously lands on record and immediately returns to its rest.	1 Automatic trip mechanism binding.	1 Check freedom of movement of the friction and cycle levers. Check condition of impulse link. Replace as necessary.
Pickup arm lowers too fast.	1 Cueing rate requires adjustment.	1 Adjust nut 80256 clockwise. See 'Dismantling main component assemblies".
	2 Lack of sufficient viscous damping fluid on cueing lifter.	2 Recharge cueing lifter spindle, using only fluid part no. 71723/004. See 'Adjustments'.
Pickup arm lowers on to record and jumps first few playing grooves.	1 Stylus lands at top of record groove guard rim and slides down it.	1 Set lowering position inwards so that stylus lands at bottom of guard rim. See 'Adjustments'.
	2 Insufficient bias force applied.	2 Reset. See 'Adjustments'.

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Additional faults - miscellaneous

Symptom	Cause	Remedy
Unit fails to trip automatically at the end of the record size.	1 Automatic trip binding.	1 Check freedom of friction and cycle levers 80399 and 81588.
	2 Mechanism drive belt broken.	2 Replace drive belt.
Unit fails to switch off automatically.	1 Programme lever 80662 binding.	1 Check that the programme lever pivots freely and that the selector link can slide up and down.
	2 'Mode' selector moved to 'Off' position during automatic cycle.	2 Check that the selector link is not disengaged with programme.
'Mode' selector cannot be re-programmed.	1 Selector moved to 'Off' position during the automatic cycle.	1 Rotate the turntable hub a few times in a clockwise direction to release the selector.
Various faults according to model, e.g. dim strobe lamp, low speed to start.	1 Switch cams not actuating micro switches.	1 Slacken fixing screws, bias switch toward cam and retighten screws.

Routine maintenance

Careful design has reduced the need for maintenance to a minimum, but attention to the following points will prolong trouble-free listening.
It will be noted that only the turntable and its spindle require lubrication.

The pickup cartridge stylus.

If the stylus tip gathers dust, sound quality will suffer. Brush the dust away with an artist's camel-hair brush, working only from the back of the stylus towards the front to avoid bending it. Do not use solvent without the cartridge manufacturer's approval. Examine the stylus tip under a microscope of 50X magnification for wear periodically, as the cartridge manufacturer advises. A worn or shipped stylus tip damaged records permanently.

The turntable mat

Periodically remove the mat and clean it with a soft brush or a slightly moistened sponge.

The drive system (Belt drive units)

Once a year, remove the turntable and belt. Care must be taken to avoid contaminating the rubber drive belt with oil. Clean the drive drum with lint-free cloth. Before reassembly, apply a thin film of lubricating oil, part no. 78243/001, or similar grade sewing machine oil, to the thrust bearing and turntable spindle. Also check the condition of the drive belt and fit a new one if in doubt.

Note: If the driving surfaces of the drive drum and belt become contaminated with lubricant, wipe them with a clean lint-free cloth moistened with alcohol.

The Company reserves the right to alter specifications without notice.

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